

REMARKS

Claims 1-49 are currently pending in the application, with claims 1, 2, 19, 43 and 44 being independent. Claims 1-49 were pending prior to the Office Action. In this Reply, claims 1, 2, 19, 43 and 44 have been amended.

The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein. Applicant respectfully requests favorable consideration thereof in light of the amendments and comments contained herein, and earnestly seeks timely allowance of the pending claims.

Claim Rejections – 35 U.S.C. §103

The Examiner rejected claims 1, 3-5, 11, 13, 15, 18 and 43 under 35 U.S.C. § 103(a) as being unpatentable over US 6,137,535 (“Meyers”) in view of US 7,084,905 (“Nayar”). The Examiner rejected claims 6, 7 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 7,139,028 (“Itano”). The Examiner rejected claims 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of Itano and US 6,933,972 (“Suzuki et al.”). The Examiner rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 5,063,439 (“Tabei”). The Examiner rejected claims 16-17 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 5,055,921 (“Usui”). The Examiner rejected claim 41 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of US 5,289,269 (“Sugimori”). The Examiner rejected claims 2, 19, 20, 22-25, 31, 33, 35, 38, 39, 40, 42, 44, 45 and 47-49 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of US 2002/0113888 (“Sonoda”). The Examiner rejected claims 21, 26-27, 32 and 46 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Itano. The Examiner rejected claims 28-30 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Suzuki. The Examiner rejected claim 34 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Tabei. The Examiner rejected

MRC/CET

claims 36-37 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Usui.

Applicant traverses these rejections.

Applicant has amended independent claims 1, 2, 19, 43 and 44.

Applicant has amended claim 1 to recite that the image pickup device further comprises an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas, and claim 43 to recite that the image pickup device further comprises an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas.

Applicant has amended claim 2 to recite that the image pickup device further comprising an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas.

Applicant has also amended claim 19 to recite the image sensor further comprising an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas.

Applicant has amended claim 44 to recite that the image pickup device further comprises an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the channels are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas.

The amendments to claims 1, 2, 19, 43 and 44 are supported by at least Fig. 4 and page 23 lines 10-15 in the specification.

To establish a *prima facie* case of obviousness, the Examiner has the burden of meeting the basic criterion that the prior art must teach or suggest all of the claim limitations.

Regarding this basic criterion, the Applicant submits that the references do not teach or suggest an image pickup device comprising an element isolation zone arranged between the segments in

MRC/CET

one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas, as recited in claim 1 or an image sensor comprising an element isolation zone arranged between the segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas as recited in claim 19, or the similar recitations of claims 2, 43 and 44.

Meyers merely discloses a compact digital camera formed with a lenslet array 10 comprised of a plurality of lenslets 12, each lenslet having a decentration corresponding to its radial position in the lenslet array 10 so that the axial ray of each lenslet 12 views a different segment of a total field of view. A photosensor array 20 comprised of a plurality of sub-groups of photodetectors 22 is positioned such that each sub-group 22 is located along the axial ray of a respective lenslet 12. A field limiting baffle comprised of at least one aperture plate is positioned such that the center of the apertures are located along the axial ray of a respective lenslet (Abstract, Figs. 1B and 2).

Meyers does not illustrate any element isolation zone arranged between segments in a photoelectric conversion area. If photodetector elements 24 in Meyers were considered to represent segments of a photodetector 22 (which Applicant does not admit), no isolation zone is shown between G/R/G/R photodetector elements 24 in Fig. 2, for example. Furthermore, Meyers does not disclose any transfer electrodes formed so as to avoid an element isolation zone and to exist between photoelectric conversion areas.

Thus, Meyers does not teach or suggest an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas as recited in claim 1, or an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19. Meyers does not have an element isolation zone arranged between segments in one photoelectric conversion area.

In the present image pickup device as recited in claim 1, the element isolation zone is formed between the segments in one photoelectric conversion area and consequently forms a cross-shape. The transfer electrodes (or channels as recited in claims 2, 19 and 44) are formed to extend in the perimeter area of the one photoelectric conversion area, in order to avoid the element isolation zone between the segments.

Meyers teaches against the invention recited in claims 1, 2, 19, 43 and 44. The device in Meyers has a photodetector area 22 (sub-group or pixel area) which is formed by many photodetector elements 24 arranged next to each other along many lines and columns (Figs. 1 and 2). If Meyers were modified to include an element isolation zone formed between the photodetector elements 24, and transfer electrodes were formed so as to avoid the element isolation zone and to exist between the photodetector areas 22, the most outside of the photodetector elements 24 in one photodetector area 22 would contact the transfer electrodes or channels, but the inside photodetector elements 24 in the photodetector area 22 would not be able to contact the transfer electrodes or channels. Thus, such an imaging device would not function properly because the inside photodetector elements 24 (for example, all photodetector elements 24 which are completely surrounded by other photodetector elements 24 in Fig. 1B) could not contact any transfer electrodes or channels to apply electricity and output an image signal. Thus, Meyers not only does not teach all the elements recited in claims 1, 2, 19, 43 and 44, but also teaches against the invention recited in claims 1, 2, 19, 43 and 44. Meyers teaches away from an element isolation zone arranged between segments in one photoelectric conversion area, with transfer electrodes formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas. Thus, Meyers teaches away from the invention recited in claims 1, 2, 19, 43 and 44.

Nayar illustrates (see for example Fig. 11) a light shields layer 113 with respective apertures 118 and 119 above the photosensitive surfaces 191 of the left and right light-sensing elements. Photodiodes have an associated transfer gate electrode 114 (col. 16 lines 16-18). Nayar does not disclose or suggest any photoelectric conversion area two-dimensionally partitioned into a plurality of segments. Nayar also does not illustrate any element isolation zone arranged between segments in a photoelectric conversion area. Furthermore, Nayar does not disclose any

transfer electrodes formed so as to avoid an element isolation zone and to exist between photoelectric conversion areas.

Thus, Nayar does not teach or suggest an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas as recited in claim 1, or an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19. Nayar does not have an element isolation zone arranged between segments in one photoelectric conversion area.

Sonoda discloses a solid-state image pickup element in which each of pixel groups 102a to 102d are formed with a two-dimensional array of pixels 101, where a pixel 101 has a photodiode (Fig. 2). Sonoda does not illustrate any element isolation zone arranged between segments in a photoelectric conversion area. If pixels 101 were considered to represent segments of a pixel group 102 (which Applicant does not admit), no isolation zone is shown between the pixels 101 in Figs. 3A and 3B, for example.

Furthermore, Sonoda does not disclose any transfer electrodes formed so as to avoid an element isolation zone and to exist between photoelectric conversion areas.

Thus, Sonoda does not teach or suggest an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19.

In the present image pickup device as recited in claim 1, the element isolation zone is formed between the segments in one photoelectric conversion area and consequently forms a cross-shape. The transfer electrodes (or channels as recited in claims 2, 19 and 44) are formed to extend in the perimeter area of the one photoelectric conversion area, in order to avoid the element isolation zone between the segments.

Sonoda teaches against the invention recited in claims 2, 19 and 44. The device in Sonoda has a pixel group 102 which is formed by many pixels 101 arranged next to each other in a square

(Figs. 3A and 3B). If Sonoda were modified to include an element isolation zone formed between the pixels 101, and transfer electrodes were formed so as to avoid the element isolation zone and to exist between the pixel groups 102, the most outside of the pixels 101 in one pixel group 102 would contact the transfer electrodes or channels, but the inside pixels 101 in a pixel group 102 would not be able to contact the transfer electrodes or channels. Thus, such an imaging device would not function properly because the inside pixels 101 (for example, all pixels 101 which are completely surrounded by other pixels 101 in Fig. 2) could not contact any transfer electrodes or channels to apply electricity and output an image signal.

Thus, Sonoda does not teach all the elements recited in claims 2, 19 and 44, and also teaches against the invention recited in these claims. Sonoda teaches away from an element isolation zone arranged between segments in one photoelectric conversion area, with transfer electrodes formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas. Thus, Sonoda teaches away from the invention recited in claims 2, 19 and 44.

Itano merely discloses an image pick-up element including pixel areas 2a-2d, and in each pixel area multiple pixels are arranged two-dimensionally (col. 4 lines 65-67), i.e., each area 2a etc. includes multiple pixels, as illustrated in Fig. 8 and Fig. 14.

Itano does not illustrate any element isolation zone arranged between segments in a photoelectric conversion area. Furthermore, Itano does not disclose any transfer electrodes formed so as to avoid an element isolation zone and to exist between photoelectric conversion areas. For example, output lines cross every space between the pixels in each pixel area 2a-2d in Fig. 8.

Thus, Itano does not teach or suggest an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas as recited in claim 1, or an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19.

In the present image pickup device as recited in claim 1, the element isolation zone is formed between the segments in one photoelectric conversion area and consequently forms a cross-shape. The transfer electrodes (or channels as recited in claims 2 and 19) are formed to extend in the perimeter area of the one photoelectric conversion area, in order to avoid the element isolation zone between the segments.

Itano teaches against the invention recited in claims 1, 2 and 19. The device in Itano in Fig. 8 (and Fig. 10 which is a sectional view taken along a line 10-10 in Fig. 8) has a pixel area 2a/2b/etc. which is formed by many pixels (see Fig. 8) arranged next to each other. If Itano were modified to include an element isolation zone formed between the pixels inside a pixel area 2a, and transfer electrodes were formed so as to avoid the element isolation zone and to exist between the pixel areas 2a, 2b, the most outside of the pixels in pixel area 2a would contact the transfer electrodes or channels, but the inside pixels in the pixel area 2a could not contact the transfer electrodes or channels. Thus, such an imaging device would not function properly because the inside pixels (for example, the pixel located at the center of the pixel area 2a, that pixel being completely surrounded by other pixels in the pixel area 2a in Fig. 8, or the pixels 905 which are completely surrounded by other pixels in image pickup area 901 in Fig. 14) would not be able to contact any transfer electrodes or channels to apply electricity and output an image signal.

Thus, Itano does not teach all the elements recited in claims 1, 2 and 19, and in fact teaches against the invention recited in claims 1, 2 and 19. Itano teaches away from an element isolation zone arranged between segments in one photoelectric conversion area, with transfer electrodes formed so as to avoid said element isolation zone and to exist between said photoelectric conversion areas.

Suzuki does not disclose photoelectric conversion areas partitioned into segments, or arrangement of transfer electrodes/transfer channels as claimed. For example, in Fig. 2 of Suzuki et al., photoconversion elements 10 (Fig. 1) are not partitioned into segments. Furthermore, the output signal lines (e.g., 30) and wiring lines (e.g., 31, 32) cross over all the areas which are not used for photoconversion (areas separating photoconversion elements).

Thus, Suzuki does not teach or suggest an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric

MRC/CET

conversion areas as recited in claim 1, or an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19.

Tabei, Usui and Sugimori do not discuss an isolation zone, photoelectric conversion area segments and arrangement of transfer electrodes/transfer channels. Thus, Tabei, Usui and Sugimori do not teach or suggest an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas as recited in claim 1. Tabei and Usui also do not teach or suggest an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19.

Thus, none of the references teaches or suggests an image pickup device comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer electrodes are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 1, or an image sensor comprising an element isolation zone arranged between segments in one photoelectric conversion area, wherein the transfer channels are formed so as to avoid said element isolation zone and to exist between photoelectric conversion areas, as recited in claim 19, or the similar recitations in claims 2, 43 and 44.

Furthermore, Meyers, Nayar, Itano and Sonoda teach against the invention recited in claims 1, 2, 19, 43 and 44.

Therefore, the present invention is not obvious over any combination of Meyers, Nayar, Itano, Suzuki, Tabei, Usui, Sugimori and Sonoda (assuming these references can be combined, which Applicant does not admit) because the references do not disclose all the elements of the claims and, furthermore, the references teach away from the invention as recited in claims 1, 2, 19, 43 and 44. If a modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Furthermore, if the

proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). M.P.E.P. 2143.01.

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. § 103 rejection of claims 1, 2, 19, 43 and 44. Claims 3-18 and 41 depend from claim 1 and are allowable at least by virtue of their dependency. Claims 45-47 depend from claim 2 and are allowable at least by virtue of their dependency. Claims 20-40, 42 and 48 depend from claim 19 and are allowable at least by virtue of their dependency. Claim 49 depends from claim 44 and is allowable at least by virtue of its dependency.

MRC/CET

CONCLUSION

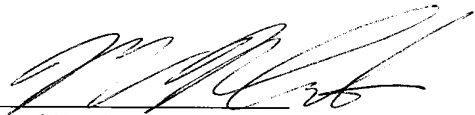
In view of the above amendments and remarks, this application appears to be in condition for allowance and the Examiner is, therefore, requested to reexamine the application and pass the claims to issue.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Corina E. Tanasa, Registration No. 64,042, at telephone number (703) 208-4003, located in the Washington, DC area, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: June 9, 2009

Respectfully submitted,

By 

Michael R. Cammarata

Registration No.: 39,491

BIRCH, STEWART, KOLASCH & BIRCH, LLP

8110 Gatehouse Road, Suite 100 East

P.O. Box 747

Falls Church, Virginia 22040-0747

(703) 205-8000

Attorney for Applicant

MRC/CET